

REMARKS

Claims 4-8 are pending in the above-identified application. Claims 4-8 were rejected.

With this Amendment, claim 4 and 7 are amended. Accordingly, claims 4-8 remain at issue.

I. 35 U.S.C. § 112 Indefiniteness Rejection of Claims

Claim 4 was rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Applicant respectfully traverses this rejection.

Applicant respectfully asserts that the specification provides ample support to satisfy the enablement requirement with respect to claim 4, and in particular, the “shut-off holding unit.” Applicant takes this opportunity to clarify the invention for the Examiner and cite to specific portions of the specification that serve to satisfy the enablement requirement.

The specification discloses that a detector 32 is connected between the external plus terminal 5 and the external minus terminal 17. (page 17, lines 2-3.) This detector 32 continuously detects the voltage between the external plus terminal 5 and the external minus terminal 17. (page 17, lines 4-5.) A resistor block 31 is connected in parallel with the detector 32 between the external plus terminal 5 and the external minus terminal 17. (page 17, lines 5-7.) The resistor block 31 preferably has a resistance between $1k\Omega$ and $200M\Omega$. (page 16, lines 27-29.)

If the external plus terminal 5 and the external minus terminal 17 of the protection circuit 30 are short-circuited by an electrical wire, or a load having a low resistance from outside the battery pack, a large current is forced out of the battery cell 1. (page 17, line 30 through page 18, line 3.) This abnormal current is detected by the overcurrent voltage detection terminal 23 of the control IC 7, which outputs a discharging control signal 25 to turn the discharging control switch 13 off, or open it. (page 18, lines 3-7.) As a result, the discharging of the battery is shut off.

(page 18, line 7.) The shut-off holding means, comprising the resistor block 31 in conjunction with the detector 32, maintains the position of the discharge control switch 13 in the off position. (Page 17, lines 13-20; Page 18, line 12-15.) The discharge control switch position is maintained until a predetermined voltage is applied to the external terminals and the detector 32 sends the detection result to the input terminal 33 of the IC 7. (Page 18, lines 16-25.) Additionally, the resistor block 31 is used to prevent repetitive overcurrent conditions caused by the application and removal of the low resistance or short circuit condition. (Page 19, line 21-31.)

One of ordinary skill in the art would appreciate that the resistor block 31 in conjunction with the detector 32 are effective to hold the discharge control switch 13 in the off position on the occurrence of a overcurrent condition. Additionally, a resistor of the claimed magnitude, serves to prevent repetitive overcurrent conditions caused by the application and removal of a low resistance or short circuit condition. Therefore, the shut-off holding means, as recited in claim 4, is sufficiently described so as to comply with the enablement requirement. Accordingly, Applicant respectfully requests this rejection be withdrawn.

II. 35 U.S.C. § 103 Obviousness Rejection of Claims

Claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of *Lieser* (U.S. Patent No. 3,480,940).

In relevant part, claim 4 recites:

“a shut-off holding unit connected between the battery cell positive terminal and an external negative terminal of the protection circuit, comprising (a) a resistor block of resistance larger than 1 k Ω and smaller than 200 k Ω ; and (b) a detector in parallel with the resistor block for detecting voltage between an external plus terminal and the external minus terminal, wherein”

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“the overvoltage detection unit detects an abnormal discharge of the battery caused by shorting or connecting a low resistance between the external plus terminal and the external minus terminal, the discharge shut-off switch opens in response to a abnormal discharge, the shut-off holding unit maintains the discharge shut-off in the open position;, and.”

This is clearly unlike *Lieser* which discloses an apparatus for indicating the operability of an appliance which draws power periodically from an electrical supply, such as a refrigerator of freezer. (col. 1, lines 9-13.) Unlike the claimed invention, Applicant respectfully submits that *Lieser* is not directed to providing a protection circuit to shut off discharge. *Lieser* simply discloses an apparatus having a battery 30 with an adjustable battery discharge resistor 34 connected across the battery 30. (col. 2, lines 64-66.) The discharge rate in *Lieser* may be varied by adjusting the discharge resistor 34 to keep the battery voltage above a predetermined minimum value while the appliance is operating at a normal level. (col. 2, lines 67-69.)

Unlike independent claim 4, *Lieser* does not disclose or suggest a shut-off holding unit comprising a resistor block of resistance larger than 1 k Ω and smaller than 200 k Ω and a detector for detecting the voltage between a external plus and minus terminal. Further, the adjustable battery resistor in *Lieser* is quite different from the claimed shut-off holding unit. Unlike claim 4, *Lieser* discloses an adjustable resistor to keep the battery voltage above a minimum while the appliance is operating at a normal level. Claim 4, however, recites that the shut-off holding unit is used to maintain the position of a discharge shut-off switch triggered by a overcurrent condition. This feature of the claim is not disclosed or contemplated by *Lieser*.

Therefore, because the AAPA and *Liestar* and any combination of the two fails to disclose, or even fairly suggest, every feature of claim 4, the rejection is improper.

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of *Lieser* (U.S. Patent No. 3,480,940) and *Fasen et al.* (U.S. Patent No. 4,767,977).

Because claim 6 depends directly or indirectly from claim 4, it is patentable for the same reasons.

Claim 8 was rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of *Lieser* (U.S. Patent No. 3,480,940) and *Mukainakano et al.* (U.S. Patent No. 6,403,261).

Because claim 8 depends directly or indirectly from claim 4, it is patentable for the same reasons.

III. Conclusion

In view of the above amendments and remarks, Applicant submits that all claims are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

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